

**REMARKS**

The Office Action dated May 10, 2004 has been carefully considered. Claims 1, 4 and 6 are currently amended. Claims 1-7 are currently pending. Although the Office Action indicates Claims 1-6 are pending, Claim 7 was added by way of preliminary amendment.

**35 USC §112, ¶2 Rejections**

Claim 1-3 and 6 stand rejected under 35 USC § 112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. The Office Action indicates that said acrylic acid-containing absorbed in said acrylic acid absorption column in step c of Claim 1 is “obtained,” not absorbed. Claim 1 has been amended to replace absorbed with obtained thereby obviating the rejection of claims 1-3.

The Office Action indicates that Claim 6 does not recite any positive steps. Claim 6 has been amended to recite the positive step of polymerizing the acrylic acid. Therefore the Applicant respectfully requests withdrawal of this rejection.

**35 USC §103 Rejections**

Claims 1-6 stand rejected as obvious under 35 USC §103(a) as being unpatentable over U.S. Patent No. 4,873,368 to Kadowski (“Kadowski”). Claims 1 and 4 are currently amended to highlight that the first and second reaction zones are formed in a single reactor. Support for these amendments can be found throughout the specification and specifically on page 6, lines 5-8 and FIG. 1.

The amended claims more clearly highlight the difference between the apparatus disclosed in Kadowski and the present invention. As opposed to the invention as claimed, the apparatus of Kadowski has a separate reaction apparatus for each of the first-stage reaction and the second stage reaction. FIGS. 1 and 2 of Kadowski represent only the first stage reaction apparatus. The gases catalyzed in the apparatus are sent out of the apparatus through gas outlet

15 to the second-reaction apparatus. See column 9, line 12 -16. The second-stage reaction apparatus “can be of any construction and structure suitable for and capable of receiving the gases formed in the first-stage reaction apparatus. . .” See column 10, lines 61-64. This clearly indicates that the first-stage reaction apparatus is a separate apparatus from the second-stage apparatus. In fact, a drawing of the second stage apparatus is not provided.

In contrast, the invention as presently claimed require that the first reaction zone and second reaction zone are formed in a single reactor by dividing reaction tubes with at least one perforated tube plate. Additionally, the invention as presently claimed limits in (b) the water concentration to between 0 – 10 vol. %. In contrast, Kadowski teaches a ratio of steam/propylene that is limited to less than 4, resulting in a range of permissible steam from 0 to 28 % at the low end of propylene concentration to 0 to 60% at the high end of propylene concentration. However, Kadowski does not teach the importance of keeping the water concentration between 0 and 10 vol. % at the first-stage reaction. As disclosed in the present invention, the amount of water introduced to the first reaction zone affects the water concentration of the acrylic acid-containing solution and is therefore limited to 0-10%, which in turn limits the water concentration of the bottom liquid of absorption column.

Finally, Kadowski neither discloses nor suggests the absorption step, c, as claimed in the present invention, resulting in solution with a water concentration in the range of 1 - 45 wt.%. The effect of such step is to restrain fluctuation of loss of acrylic acid in the absorption column and to keep waste water generated from the process to a minimum, and to secure the stability of operation at the subsequent steps including the equipment for the treatment of the waste water. In fact, Kadowski does not teach introducing an acrylic acid-containing solution into an absorption column at all. Therefore, the Applicant respectfully requests withdrawal of the rejection.

### **Double Patenting**

Claims 1-6 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over co-pending application No. 10/632,762 in view of Kadowski. For the reasons discussed above with reference to Kadowski,

the Applicant respectfully contends that the claims are not obvious. In particular, the claims as amended now recite that the first reaction zone and second reaction zone are formed in a single reactor. The co-pending application uses individual reactors for each stage reaction.

In view of the foregoing, Applicants submit that all pending claims are in condition for allowance and request that all claims be allowed. The Examiner is invited to contact the undersigned should he believe that this would expedite prosecution of this application. The Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 13-2165.

Respectfully submitted,

Dated:



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